

Vol. 110 No. 2 February 1, 1949

The American FERTILIZER

All Fertilizer and Feeding Materials



1850—1949

POTASH SALTS
SULPHATE *of* AMMONIA
NITRATE *of* SODA
NITROGENIC TANKAGE
(Activated Sludge)
DEFLUORINATED PHOSPHATE

Importers

Exporters

PERUVIAN BIRD GUANO, FISH MEAL
BONE MEAL, TANKAGE, BLOOD
NITROGENOUS

99 Years of Service

H. J. BAKER & BRO.

271 Madison Avenue, New York

BALTIMORE • CHICAGO • SAVANNAH • BUENOS AIRES



how to feed a farm

Put nitrogen on the menu. It fattens harvests and breadbaskets. It helps give the world something to taste besides hunger. Of all the commercial sources of nitrogen, none is more economical than ammonia.

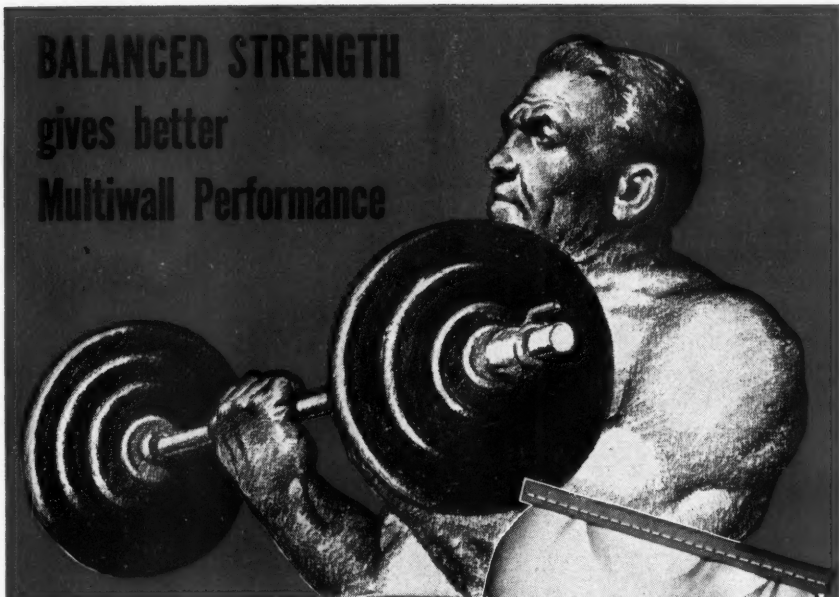
CSC is producing anhydrous ammonia at its Dixie Plant at Sterlington, Louisiana. Working at capacity, Commercial Solvents Corporation is supplying the major part of its output to Gulf Coast manufacturers for conversion into nitrogen-rich fertilizers.



COMMERCIAL SOLVENTS CORPORATION, AGRICULTURAL DIVISION, 17 EAST 42nd STREET, NEW YORK 17, N. Y.

Published every other Saturday. Annual subscription: in the United States, \$3.00; Canada and Mexico, \$4.00; other countries, \$5.00. Entered as second-class matter, January 15, 1910, at the Post Office at Philadelphia, Pa., under Act of March 3, 1879. Registered in United States Patent Office. Publication office, 1900 Chestnut St., Phila. 3, Pa.

BALANCED STRENGTH
gives better
Multiwall Performance



BALANCED STRENGTH of Bemis Multiwall Paper Shipping Sacks is the result of control of paper quality plus careful manufacturing methods. Always specify Bemis Multiwalls for fertilizer.

BEMIS

"America's No. 1 Bag Maker"



Peoria, Ill. • East Pepperell, Mass. • Mobile, Ala. • Vancouver, Wash.
San Francisco, Calif. • Wilmington, Calif. • Houston, Texas
Baltimore • Boise • Boston • Brooklyn • Buffalo • Charlotte • Chicago • Cleveland • Denver
Detroit • Indianapolis • Jacksonville, Fla. • Kansas City • Los Angeles • Louisville • Memphis
Minneapolis • New Orleans • New York City • Norfolk • Oklahoma City • Omaha
Phoenix • Pittsburgh • St. Louis • Salina • Salt Lake City • Seattle • Wichita

A Complete Service

THE strategic factory locations of The American Agricultural Chemical Company, as shown on the accompanying map, assure prompt, dependable service for the complete line of products listed below.

We manufacture all grades of Commercial Fertilizers, Superphosphate, Agrinite Tankage, Bone Black, Bone Black Pigments (Cosmic Black), Bone Ash, Bone Oil, Dicalcium Phosphate, Monocalcium Phosphate, Gelatin, Agricultural Insecticides (including Pyrox, Arsenate of Lead, Calcium Arsenate, etc.), Trisodium and Disodium Phosphate, Phosphorus, Phosphoric Acid, Sulphuric Acid, Ammonium Carbonate, Ammonium Fluosilicate, Magnesium Fluosilicate, Potassium Fluosilicate, Phosphorus Pentasulphide, Phosphorus Sesquisulphide (lump), Zinc Fluosilicate, Salt Cake; and we are importers and/or dealers in Nitrate of Soda, Cyanamid, Potash Salts, Sulphate of Ammonia, Raw Bone Meal, Steamed Bone Meal, Sheep and Goat Manure, Fish and Blood. We mine and sell all grades of Florida Pebble Phosphate Rock.



FACTORIES

Alexandria, Va.	Cleveland, Ohio	No. Weymouth, Mass.
Baltimore, Md.	Detroit, Mich.	Pensacola, Fla.
Buffalo, N. Y.	Fulton, Ill.	Pierce, Fla.
Carteret, N. J.	Greensboro, N. C.	Port Hope, Ont., Can.
Cayce, S. C.	Havana, Cuba	Savannah, Ga.
Chambly Canton, Quebec, Can.	Henderson, N. C.	Searsport, Maine
Charleston, S. C.	Montgomery, Ala.	South Amboy, N. J.
Cincinnati, Ohio	Nat. Stockyards, Ill.	Spartanburg, S. C.
	Norfolk, Va.	

The AMERICAN AGRICULTURAL CHEMICAL Co.

50 Church Street, New York 7, N. Y.

SALES OFFICES



Alexandria, Va.	Clinton, Iowa	Laurel, Miss.	Pensacola, Fla.
Baltimore, Md.	Columbia, S. C.	Montgomery, Ala.	Pierce, Fla.
Buffalo, N. Y.	Detroit, Mich.	Montreal, Quebec, Can.	Port Hope, Ont., Can.
Carteret, N. J.	Greensboro, N. C.	National Stockyards, Ill.	Savannah, Ga.
Charleston, S. C.	Havana, Cuba	New York, N. Y.	Spartanburg, S. C.
Cincinnati, Ohio	Henderson, N. C.	Norfolk, Va.	Wilmington, N. C.
Cleveland, Ohio	Houlton, Me.	No. Weymouth, Mass.	



Trona Muriate of Potash

Potash, one of the important ingredients of mixed fertilizer, is a vital soil nutrient which aids crop production and helps resist plant diseases. To provide the maximum of this important plant food, we are operating full capacity at Trona, 24 hours a day.

Three Elephant Borax

Agricultural authorities have shown that a lack of Boron in the soil can result in deficiency diseases which seriously impair the yield and quality of crops. When Boron deficiencies are found, follow the recommendations of your local County Agent or State Experimental Stations.



AMERICAN POTASH & CHEMICAL CORPORATION

122 EAST 42nd STREET

• • •

NEW YORK 17, N. Y.

**231 S. LA SALLE STREET
CHICAGO 4, ILLINOIS**

**214 WALTON BUILDING
ATLANTA 3, GEORGIA**

**3030 WEST SIXTH STREET
LOS ANGELES 34, CALIF.**

"Pioneer Producers of Muriate in America"

NOW LION *Nitrogen* SOLUTIONS

HELP YOU INCREASE

THE NITROGEN
CONTENT OF YOUR
MIXED FERTILIZERS

and
Lower your Costs

You get these

EXTRAS

EXTRA QUALITY

EXTRA NITROGEN

EXTRA PROFITS

Lion Nitrogen Solutions give you the means of using maximum amounts of both ammonia nitrogen and nitrate nitrogen in your mixed fertilizers. Lion Nitrogen Solutions give you more nitrogen per dollar. Properly used, they produce fertilizers that cure rapidly, store well and drill efficiently. That means extra profit for you because Lion Nitrogen Solutions supply in one operation the nitrogen that is usually added separately by several nitrogen carriers.

Write to Lion Oil Company, Chemical Division, El Dorado, Arkansas for complete details today.

LION NITROGEN SOLUTIONS—COMPOSITION

LION SOLUTIONS	AMMONIUM NITRATE %	ANHYDROUS AMMONIA %	WATER %	NITROGEN CONTENT (%)		
				NITRATE %	AMMONIA %	TOTAL
NITROGEN SOLUTION ... 1	65.0	21.7	13.3	11.38	29.22	40.6
NITROGEN SOLUTION ... 2	55.5	26.0	18.5	9.71	31.10	40.8
NITROGEN SOLUTION ... 3	66.8	16.6	16.6	11.69	25.34	37.0

Chemical Division
LION OIL COMPANY
EL DORADO, ARKANSAS



The American FERTILIZER

Vol. 110

FEBRUARY 5, 1949

No. 3

Radioactive Fertilizers Discussed at Industry Meeting

Soil Scientists Report Results from Radioactive Materials Used in Plant Growth Research. No Evidence of Improvement in Crop Quality or Quantity

A meeting of agricultural experiment officials and members of the fertilizer industry was held at the Department of Agriculture in Washington on January 26th to discuss the results of research investigations on the use of radioactive phosphorus and other materials in 1948. Both morning and afternoon sessions were well attended and the speakers presented a very complete picture of the work accomplished to date. The use of radioactive phosphates has given the best results in showing how and when phosphorus is absorbed by the growing plant from applied fertilizers. The next elements to be tested will be calcium and sulphur. It is interesting to note that the experiments at Beltsville and 13 other cooperating state experiment stations showed no improvement in the quantity or quality of crops from the radioactive fertilizer over that of the ordinary type of plant food.

Morning Session

The morning session was in charge of R. M. Salter, chief of the Bureau of Plant Industry, Soils and Agricultural Engineering. Senator Melvin Price of Illinois, a member of the Atomic Energy Commission, opened the program. He stated that the American people should be gratified to know that atomic energy is being harnessed for peacetime uses and he particularly congratulated those in agricultural work for being among the first to recognize the opportunities.

R. W. Cummings, associate director of the North Carolina Agricultural Experiment Station, outlined the basis on which the 1947-48 experiments were organized. By using radioactive isotopes as tracers, scientists have a more sensitive measure than had previously been available for measuring the efficiency of crops under various conditions in utilizing applied phosphorus.

"Problems of the natural acid soils of the humid region," Dr. Cummings explained, "were represented in the studies in North Carolina and New York. The red and yellow soils of the southeast and major row crops of the area were included in North Carolina. Problems of hay and pasture farming in the soils of the northeast, even including radioactive manure, were a part of the New York program. Calcareous soils and their problems are represented in Colorado and the Corn Belt with its soils at Iowa. In addition, Iowa and New York are giving considerable thought to organic phosphorus."

All of the radioactive fertilizers were manufactured by U. S. Department of Agriculture scientists at Beltsville, who also served as a focus for coordinating the efforts of all the participating scientists. Facilities for analyzing the radioactive samples from all locations were provided at the North Carolina Experiment Station.

Dr. W. L. Hill, of U. S. D. A., showed a moving picture of the production of radioactive phosphate. He pointed out the pre-

cautions that must be taken to protect workers from the hazards associated with highly concentrated radioactive materials.

Investigations using isotopes of radioactive phosphorus have revealed that different crops vary in their uptake of fertilizer phosphorus, according to W. L. Nelson, soil scientist at the North Carolina Agricultural Experiment Station.

Corn represents one extreme, Dr. Nelson said, in that a high proportion of the phosphorus absorbed early in the growing period comes from the fertilizer. At the end of the season, however, corn absorbs a very low proportion of its phosphorus from the fertilizer, most of it coming then from that already in the soil. Potatoes, on the other hand, depend rather heavily on the fertilizer phosphorus throughout the growing period.

Dr. Nelson attributed part of the difference between these two crops to the type of root system. Corn develops a very extensive root system and can absorb relatively high amounts of the soil phosphorus. Potatoes, in contrast, have a rather limited root system and are not so efficient in absorbing soil phosphorus.

Cotton, soybeans, alfalfa, and Ladino clover have phosphorus absorption curves somewhat like corn, Dr. Nelson said. Small grains and grasses, however, show rather low utilization. These investigations have revealed reasonably close agreement between different areas of the country in the efficiency of utilization of phosphorus by a given crop.

Only a relatively small amount of fertilizer phosphorus is actually used by plants, Dr. Nelson explained. Less than 10 per cent is taken up by cotton, corn, tobacco, or soybeans. This low efficiency of utilization emphasizes the importance of fertilizer placement studies.

Superphosphate and calcium metaphosphate were found to be the most efficient phosphatic fertilizers of those tested in initial experiments with isotopes of radioactive phosphorus, according to L. A. Dean and S. B. Hendricks, soil scientists of the U. S. Department of Agriculture.

Alpha tricalcium and dicalcium phosphate sometimes matched superphosphate and calcium metaphosphate, Drs. Dean and Hendricks said, but in other tests they lagged far behind.

In explaining how phosphate supplied by fertilizer can be differentiated from that derived from the soil, the scientists compared the "tracer technique" of marking fertilizer to the laundry mark used for a shirt. Radioactive phosphorus is just like the normal

element, the scientists said, except that every now and then an atom decomposes and the decomposition can easily be detected. Half of the radioactive phosphorus decomposes in two weeks and due to this decay a marked fertilizer can only be followed for about six months. A small amount of radioactive phosphate will do the marking job, they said.

Afternoon Session

At the afternoon session, Richard Bradfield, New York Agricultural Experiment Station, presiding, the question of placement was discussed by N. S. Hall, soil scientist at the North Carolina Agricultural Experiment Station.

Fertilizer placement studies with radioactive isotopes of phosphorus show that the efficiency with which the applied phosphorus is utilized can be varied by changing the manner of application.

During 1948, experiments with radioactive phosphorus were carried on with barley, wheat, and sugar beets at Colorado; corn at Iowa and North Carolina; Ladino clover and orchard grass mixture at New York; and cotton and tobacco at North Carolina.

Dr. Hall illustrated the influence of the weather on the efficiency of placed phosphorus with the following example: At the Rural Hall Station in North Carolina, where the season was abnormally dry, the phosphorus placed as a side dressing at the time of the first cultivation was not utilized at all. In contrast, at the Oxford Station, with very favorable moisture conditions, the utilization of the side-placed fertilizer was as good as that which was mixed in the plant row.

The importance of the location of fertilizer with respect to seed was illustrated by sugar beet trials in Colorado. In this instance, Dr. Hall said, two placements were compared: One in which the fertilizer was distributed in a band four inches to the side and four inches below seed level, and the other in which it was well mixed in the seed row four inches wide and four inches deep. In the first method of placement, none of the fertilizer was utilized until the plants had grown to five inches. However, in the second method, the fertilizer was utilized immediately. The difference was especially evident in a soil low in available phosphorus.

J. H. Jensen, of the Atomic Energy Commission, discussed the use of radioactive isotopes in the fields of biology and medicine.

Dr. F. W. Parker, assistant chief of the Bureau of Plant Industry, Soils and Agri-

(Continued on page 28)

Future Development of the Radioactive Research Program*

By F. W. PARKER

Bureau of Plant Industry, Soils, and Agricultural Engineering, Beltsville, Md.

THE cooperative research program with radioactive materials has expanded rather rapidly. The rate of growth is indicated by the number of men on the project and the quantities of radioactive phosphorus used in field experiments. In 1947 five men were working on the project. By 1950 we expect to have 25 men engaged in various phases of radioactive research at Beltsville alone. In 1947, 100 pounds of radioactive superphosphate were used in field experiments in two States. As you have heard today, the 1948 experiments involved the use of 700 pounds of superphosphate, or its equivalent, in field experiments in five States. Recently formulated plans for 1949 call for the use of about 1,100 pounds of radioactive superphosphate, or its equivalent in 15 States.

Rapid growth does not necessarily signify a sound program, so we may well examine plans. The program may be considered under three general headings:—development, fundamental, and applied research on soil and fertilizer problems.

Development Research

The handling and use of radioactive materials are so different from anything agricultural scientists have done before that considerable development work is essential before experiments in the greenhouse or field are feasible. The nature of the problems encountered is quite different for the different elements. They depend primarily on the kind of radiation emitted by the element, the length of time it remains radioactive, and its movement in the soil. During the past two years and for the next three to five years a good deal of our research will be devoted to the development of methods and techniques for the use of isotopes in agricultural research.

What have we accomplished in development research to date? Safe and effective procedures have been developed for the manufacture of different radioactive phosphates

and their use in laboratory, greenhouse, and field experiments. This was relatively easy, for radioactive phosphorus has a comparatively short life, 14.3 days, and therefore does not constitute a health hazard for more than a few months. It emits a strong beta ray, easily measured but easily stopped and far less of a hazard than the penetrating gamma ray emitted by many isotopes. Procedures have also been developed for the rapid assay of radioactive phosphorus in plant material. During the past season the North Carolina laboratory handled more than 2,000 samples.

The use of radioactive rock phosphate presents several special problems on which work is in progress. It seems improbable that the development research will have reached a point permitting field experiments with rock phosphate before 1950, although a small initial experiment may be started this year.

Initial but quite limited experiments have been conducted with radioactive calcium, which has a half life of 180 days and, therefore, if applied to a soil in quantity would present a health hazard for five to eight years.

Fertilizer distributing and placement equipment has been modified for handling radioactive fertilizers. This work is being continued. We are hopeful that thoroughly satisfactory equipment will have been perfected by the close of the year.

What development research is planned for the future? Some of the first work will be directed to the development of procedures for the safe and effective use of radioactive calcium and sulphur. This involves a study of their movement in the soil, possible contamination of drainage water, absorption by plants, and possible methods of blanketing or minimizing the radioactivity. This work is an essential first step toward field experiments in which the utilization of calcium and phosphorus from superphosphate and other fertilizer and liming materials will be studied.

Other development work will relate to procedures for the use of minor elements—copper, zinc, molybdenum, and iron—in both soil and plant nutrition investigations.

*Presented at a meeting with members of the fertilizer industry, Washington, D. C., January 26, 1949.

Fundamental Research

The fundamental research program includes:

1. A study of the chemistry of native and applied nutrient elements in soils.
2. Investigations on root-soil relationships and the absorption of nutrients by plant roots.
3. Research on the movement and function of nutrient elements in plants.

Our experiments in this field have been limited to work with radioactive phosphorus and calcium. In the case of radioactive phosphorus, initial studies have given new evidence on the reactions involved in phosphorus fixation by acid soils and the release of phosphorus to the soil solution and to plants. Similar work is in progress with calcareous soils of the West. These investigations are giving a better understanding of phosphorus in soils and may well lead to improved methods for determining the phosphorus fertility status of soils.

The radioactive calcium studies in progress relate to base exchange reactions.

The fundamental research contemplated will include work with soils and fertilizers, soil-plant relationships, and plant nutrition. The investigations in progress on phosphates are to be intensified. In addition, isotopic methods are being developed that may be useful in characterizing rock phosphate from different sources. Such studies will be conducted along with vegetative tests with rock phosphates. We are also hopeful that the better characterization of rock phosphates will be useful in explaining their behavior while being processed by either wet or thermal methods.

As another example, let us consider potash. Radioactive potassium has a half life of only 12.4 hours, so it cannot be used in experiments of more than a few days duration. Field experiments such as those with phosphates are impossible. Nevertheless, it may be useful in fundamental studies on the chemistry of potassium in soils. We know that soils differ widely in the rate at which they release mineral or non-exchangeable potash to growing crops. They also differ in the extent to which they fix applied potash, and reduce its availability to plants. The nature of the release and fixation reactions will be studied by means of radioactive potassium. It may possibly offer a method for estimating the non-exchangeable potash in soils and its rate of release. Isotopic techniques certainly offer a promising method of advancing our knowledge of the chemistry of potash in soil colloids.

Liming is known to influence the availabil-

ity of potash. Careful studies with radioactive potash and radioactive limestone may help to clarify the calcium-potash relationships in both soils and plants.

Our knowledge of the chemistry of minor elements such as copper and zinc in soils is quite limited. This is due in part to inadequate methods for measuring very small quantities. As you well know, radio isotopic techniques are extremely sensitive. We believe, therefore, that they will be exceptionally useful in studying the chemistry and movement of minor elements in soils. Progress in this field may be slow. We shall probably concentrate our initial efforts on one element—zinc—rather than spreading our efforts.

The fundamental research with plants will be directed primarily to studies on the movement and function of certain of the minor elements. Such work will have a direct bearing on many nutritional problems of both annual and tree crops. One such problem is chlorosis that is so widespread in several Western States.

Applied Research

The application of isotopic methods to soil, fertilizer, and crop production problems is undoubtedly of major interest to this group. The work of the last two years has adequately demonstrated the utility of isotopic methods in fertilizer investigations. To date work in the applied field has been restricted to radioactive phosphorus. What of the future program?

The 1949 research program will be limited to phosphorus and will be similar in most respects to that conducted last year. It will involve comparisons of crops, sources of phosphorus, rates and placement of phosphates on different soils. According to present plans, experiments will be conducted in New York, Ohio, Indiana, Wisconsin, Iowa, North Carolina, South Carolina, Georgia, Florida, Mississippi, Texas, Colorado, Arizona, and Idaho.

The phosphorus materials experiments have been limited to superphosphate, ammoniated superphosphate, dicalcium, alpha tricalcium, and calcium metaphosphate. This year some of the experiments will include ammonium phosphate. If effective methods are developed, liquid phosphoric acid and rock phosphate will be included in the field experiments. Special emphasis is being given to comparisons of phosphate materials on the calcareous soils of the West. The results should be useful in connection with the development of our Western phosphorus resources.

(Continued on page 20)

Effect of Ammonium Nitrate on Corn Production in Oklahoma in 1948

By HORACE J. HARPER and O. H. BRENSING

Oklahoma Agricultural Experiment Station, Stillwater, Okla.

AVAILABLE nitrogen has become a limiting factor in corn production on many deep sandy upland and bottomland soils in central and eastern Oklahoma as a result of the continued production of soil-depleting crops. A mixed fertilizer such as 4-12-4, or 5-10-5, is only a starter fertilizer so far as the nitrogen requirement of a corn crop is concerned. The nitrogen in 150 pounds of a 4-12-4 fertilizer will produce about three bushels of corn. Unless the soil can supply the additional nitrogen needed to meet plant requirements, a relatively low yield would be obtained. On low nitrogen soils, a soluble nitrogen fertilizer applied just prior to the time that corn begins to make a rapid growth will increase crop production if a starter fertilizer is applied at time of planting and soil moisture is not a limiting factor in plant development.

The phosphorus in 150 pounds of a 4-12-4 fertilizer is equivalent to the phosphorus in 45 bushels of corn. Since a complete fertilizer such as 4-16-0, 4-12-4 or 5-10-5 contains only enough nitrogen to start a corn crop when applied at low rates per acre, it is of value principally because of the phosphorus it supplies.

A rapidly growing corn crop has a high nitrogen requirement during June and July. Consequently the fertilizer should be applied as a side-dressing about May 10th in southern Oklahoma and May 20th in the northern part of the state.

Ammonium nitrate is the cheapest form of nitrogen fertilizer that can be obtained in this area, with the possible exception of anhydrous ammonia. When ammonium nitrate is added to a soil, the "ammonium" part of the fertilizer is absorbed on the surface of the clay particles and is not easily leached from the soil. The "nitrate" part of the fertilizer is not absorbed by the clay and can be leached easily from the soil during periods of excessive rainfall. When ammonium nitrate is applied as a side-dressing it should be placed in a furrow about three inches deep because the "ammonium" part of the fertilizer does not

move downward into medium and fine textured soils as rapidly as the "nitrate" and should be located where it will be available for plant use if limited rainfall should occur.

The average mixed fertilizer, such as 4-16-0, 4-12-4, or 5-10-5, contains some ammonium nitrate and some ammonium phosphate. When these fertilizers are applied in the row, plant roots will absorb a high percentage of the nitrogen, except on sandy land where the nitrate part of the nitrogen may be lost by leaching if excessive rainfall occurs while the corn plants are small. The "ammonium" nitrogen in the fertilizer is changed gradually to nitrate as a result of bacterial action; consequently young corn plants obtain nitrogen for rapid early growth from fertilizer applied in the row until the roots can extend laterally into the soil and obtain nitrogen from a wider area.

The amount of ammonium nitrate that can be safely used to increase corn production will depend on the natural crop producing capacity of the soil and seasonal hazards. On deep sandy land under normal conditions 50 pounds of ammonium nitrate will supply enough nitrogen to produce about eight bushels of corn; 75 pounds, about 12 bushels; and 100 pounds, about 16 bushels. One hundred pounds of ammonium nitrate per acre can be used on land which has a natural crop producing capacity of less than 15 bushels of corn per acre with a greater chance for profit than a similar amount of fertilizer applied on land that will produce more than 25 bushels per acre without treatment. Since July rainfall is frequently a limiting factor in corn production (about eight years out of ten) the response from nitrogen fertilization will usually be greater when an early maturing hybrid is planted as compared with a late maturing hybrid.

The results of several experiments conducted in 1948 to study the effect of ammonium nitrate applied alone and with a starter fertilizer on corn production are given in Tables 1 and 2. The average increase in corn

(Continued on page 24)

THE AMERICAN FERTILIZER

ESTABLISHED 1894

PUBLISHED EVERY OTHER SATURDAY BY

WARE BROS. COMPANY

1900 CHESTNUT ST., PHILADELPHIA 3, PA.

A Magazine international in scope and circulation devoted exclusively to the Commercial Fertilizer Industry and its Allied Industries

PIONEER JOURNAL OF THE FERTILIZER INDUSTRY

A. A. WARE, Editor

K. F. WARE, Advertising Manager

ANNUAL SUBSCRIPTION RATES

U. S. and its possessions, also Cuba and Panama.....	\$3.00
Canada and Mexico.....	4.00
Other Foreign Countries.....	5.00
Single Copy.....	.25
Back Numbers.....	.50

THE AMERICAN FERTILIZER is not necessarily in accord with opinions expressed in contributed articles that appear in its columns. Copyright, 1949, by Ware Bros. Company.

Vol. 110 FEBRUARY 5, 1949 No. 3

Principal Articles in This Issue

	PAGE
RADIOACTIVE FERTILIZERS DISCUSSED AT INDUSTRY MEETING.....	7
FUTURE DEVELOPMENT OF THE RADIO- ACTIVE RESEARCH PROGRAM, by F. W. Parker.....	9
EFFECT OF AMMONIUM NITRATE ON CORN PRODUCTION IN OKLAHOMA IN 1948, by Horace J. Harper and O H Brensing..	11
Sulphate of Ammonia Production Sets Record in 1948.....	12
Four Bids Received for Government Sul- phate of Ammonia Plant.....	13
Fertilizer Tag Sales for 1948.....	14
FERTILIZER MATERIALS MARKET	
New York.....	15
Chicago.....	16
Charleston.....	16
Philadelphia.....	18
Potato Price Support Program for 1949..	18

Sulphate of Ammonia Production Sets Record in 1948

The figures of the U. S. Bureau of Mines show that the production of by-product sulphate of ammonia during 1948 exceeded that of any previous year. The output amounted to 830,938 tons and in addition 30,825 tons were produced from synthetic ammonia purchased from other chemical manufacturers. This latter figure does not include sulphate of ammonia produced by chemical companies not operating by-product coke ovens. The 1947 figures show 809,440 tons of by-product sulphate and 11,070 tons from purchased ammonia. Production of ammonia liquor dropped from 25,718 tons NH₃ in 1947 to 24,758 in 1948.

Shipments during the year kept pace with production showing 829,128 tons of by-product material and 30,421 tons from purchased ammonia. As a result, the stocks on hand at the end of the year continued at the relatively low level of 23,927 and 498 tons respectively.

December production of both types of sulphate were at record levels, totaling 74,222 and 3,685 tons respectively.

SULPHATE OF AMMONIA

	By- Product Tons	From Synthetic Tons	Ammonia Liquor Tons NH ₃
1948			
January.....	71,875	2,257	2,094
February.....	67,416	2,104	1,990
March.....	68,758	2,296	2,090
April.....	54,468	1,953	1,719
May.....	70,887	2,758	2,143
June.....	69,268	2,406	2,073
July.....	70,272	2,807	2,107
August.....	72,046	2,303	2,082
September.....	69,860	2,167	2,073
October.....	71,002	3,065	2,186
November.....	70,864	3,024	2,068
December.....	74,222	3,685	2,133
Total for 1948.....	830,938	30,825	24,758
Total for 1947.....	809,440	11,070	25,718
		Sulphate of Ammonia Tons	Ammonia Liquor Tons NH ₃
Production			
December, 1948.....	74,222		2,133
November, 1948.....	70,864		2,068
December, 1947.....	72,237		2,219
Shipments			
December, 1948.....	77,605		1,460
November, 1948.....	67,010		1,437
December, 1947.....	75,243		1,942
Stocks on Hand			
Dec. 31, 1948.....	23,927		498
Nov. 30, 1948.....	28,040		543
Dec. 31, 1947.....	28,718		911

Four Bids Received for Government Sulphate of Ammonia Plant

Four offers to purchase the government's synthetic ammonium sulphate plant at Salem, Ore., were received by the War Assets Administration on February 2nd. The plant is now being operated under an interim lease, expiring June 30th, by Columbia Metals Corporation.

Manganese Products, Inc., Seattle, Wash., offered \$750,000 for the plant, which it said would be paid off in five years from sale of manganese and ammonium sulphate at the rate of \$2.50 per ton for manganese and \$1 per ton for the sulphate.

The J. R. Simplot Company, Boise, Idaho, offered \$225,000, of which \$45,000 would be paid in cash upon the signing of the contract and the remainder would be paid in ten equal annual instalments with interest at the rate of four per cent.

J. O. Gallagher, president, and A. W. Metzger, vice-president of Columbia Metals Corporation, acting on their own behalf, offered \$100,000 and a royalty of \$1.50 per ton for five years on the ammonium sulphate produced, plus 75 per cent of the gross proceeds received from the sale of machinery and equipment not needed for operation.

Beasley & Beasley, Washington, D. C., informed the agency by letter that it had a client willing to make a cash offering for the plant if the national security clause is not included in the contract. No indication was given of the amount that would be offered.

Bradley Promoted by Chase Bag Co.

The appointment of R. V. Bradley as Sales Manager of Chase Bag Company's Eastern Paper Bag Division has been announced by R. N. Conners, Vice-President and General Sales Manager.

Until his recent appointment, Mr. Bradley was manager of the company's New York City Sales Office, a position to which he advanced since joining Chase in 1934. He was a member of the Paper Shipping Sack Manufacturers Association's Technical Committee and other technical and bag specifications committees which recommended specifications of containers for government shipments of various commodities during the war.

Mr. Bradley's headquarters will remain in the Chase, New York Office and his duties of Manager of the New York City Sales Office will be taken over by W. J. Newhouse.

Spencer Chemical Increases Sales Staff

Spencer Chemical Company, Kansas City, Mo. has recently announced two appointments to their sales organization. Charles L. Monson has been added to the Kansas City staff of the Fertilizer and Chemical Departments. Previous to his joining Spencer Chemical Company, Mr. Monson was manager of Monson's Feed, Seed and Farm Supply Company of Wichita, Kansas. He is a graduate of Friends University, Wichita, Kansas, and during World War II served two years as a naval officer.

Howard Millington has been appointed sales representative for the company's ammonia, methanol and formaldehyde in the Chicago, Milwaukee, Minneapolis, St. Paul, Detroit, Cincinnati and Cleveland area. He will make his headquarters in Chicago.

St. Regis Opens Houston Office

The Multiwall Bag Division of St. Regis Paper Company has announced establishment of a new office at Houston, Texas, to assume functions of the Dallas office, which has been closed. The Houston office will be supervised by V. C. Douglas in Chicago.

New Partners In Dickerson Companies

The Dickerson Company and Dickersons Overseas Company, Philadelphia, brokers, importers and exporters of fertilizer materials and chemicals, are now operating as a partnership with Ralph H. Henshaw and Norman Klander as active partners. Edwin S. Dickerson, Jr., is relinquishing ownership in these companies but will continue to take an active part in the management.

Phillips Chemical Elects Crawford Vice-President and Sales Manager

C. C. Crawford has been elected vice-president and sales manager of Phillips Chemical Company. He was formerly manager of the chemical products department of the Phillips Petroleum Company, of which the Chemical Company is a subsidiary.

Sales of ammonia, sulphate of ammonia and other nitrogen fertilizer materials will be handled through the Bartlesville, Okla., office of the Chemical Company.

Fertilizer Tag Sales for 1948

Sales of fertilizer tax tags during 1948 reached an all-time high. Reports of State control officials in the 14 States requiring fertilizer tags to The National Fertilizer Association indicate that sales were equivalent to 9,251,000 short tons, an eight per cent increase over the 8,571,000 tons reported for 1947 and a six per cent increase over the 8,707,000 tons recorded for 1946, the previous peak. Compared with the 1935-1939 annual average of 4,659,000 tons, tag sales for 1948 were almost twice as great.

During the recently completed calendar

year sales, as usual, were greatest for the first quarter, the total reported for March being the highest of all 12 months. For that month, they represented 15.6 per cent of annual sales, while for January and February they represented 15.4 and 12.3 per cent respectively. After reaching their peak during March, sales dropped steadily through August to 343,000 tons, rose sharply in September, dropped in October and then rose for the remainder of the year. Sales for December, representing 8.3 per cent of the total, were noticeably below those for December 1947.

(Continued on page 28)

FERTILIZER TAX TAG SALES*

COMPILED BY THE NATIONAL FERTILIZER ASSOCIATION

	DECEMBER			% of 1947	JANUARY-DECEMBER		
	1948 Tons	1947 Tons	1946 Tons		1948 Tons	1947 Tons	1946 Tons
Virginia.....	30,959	47,016	51,767	96	633,265	657,681	669,437
N. Carolina.....	147,446	191,199	226,453	94	1,550,322	1,646,673	1,706,582
S. Carolina.....	56,488	99,600	100,150	94	883,608	943,839	943,550
Georgia.....	47,272	72,626	83,363	108	1,179,879	1,091,995	1,135,685
Florida.....	85,619	99,110	90,391	86	748,023	871,991	1,061,073
Alabama.....	59,960	50,367	81,400	137	961,578	704,252	898,650
Tennessee.....	26,248	15,881	13,026	127	447,511	353,688	331,265
Arkansas.....	22,311	22,546	22,900	141	252,914	179,194	171,250
Texas.....	31,949	31,828	46,029	117	467,069	400,691	376,942
Oklahoma.....	250	3,692	5,807	143	120,736	84,249	58,743
<i>Total South.....</i>	<i>508,502</i>	<i>633,865</i>	<i>721,286</i>	<i>104</i>	<i>7,244,905</i>	<i>6,934,253</i>	<i>7,353,177</i>
Indiana.....	169,427	84,842	116,436	114	915,776	800,151	682,366
Kentucky.....	54,618	57,101	23,825	119	554,061	465,551	328,881
Missouri.....	30,111	31,330	28,568	163	421,407	258,674	280,731
Kansas.....	5,540	8,145	2,485	102	115,118	11,453	61,353
<i>Total Midwest.....</i>	<i>259,696</i>	<i>181,418</i>	<i>171,314</i>	<i>123</i>	<i>2,006,362</i>	<i>1,636,829</i>	<i>1,353,331</i>
<i>Grand Total.....</i>	<i>768,198</i>	<i>815,283</i>	<i>892,600</i>	<i>108</i>	<i>9,251,267</i>	<i>8,571,082</i>	<i>8,706,508</i>

*State fertilizer control officials in the 14 reporting States compile monthly statistics on the sale of fertilizer tax tags and report these statistics to The National Fertilizer Association. The figures indicate the equivalent number of short tons of fertilizer represented by the tax tags sold to fertilizer producers and which are required by law to be attached to each bag of fertilizer sold in the various States. The equivalent tonnage represented by the sale of tax tags may be somewhat larger or smaller than actual sales of fertilizer, due to the lag between the purchase of tags and the delivery of fertilizer on which those tags are used.

FERTILIZER MATERIALS

FAST DEPENDABLE BROKERAGE SERVICE

Your Inquiries Solicited

FRANK R. JACKLE

405 LEXINGTON AVENUE

NEW YORK 17, N. Y.

FERTILIZER MATERIALS MARKET

NEW YORK

Sulphate of Ammonia Prices Raised by Some Producers. No Improvement in Supply of Nitrogen Solutions or Ammonium Nitrate.* More Buying of Fertilizer Organics Reported. Bone Meal Extremely Scarce. Superphosphate Supplies Normal. Potash Demand Slackens but Still Above Available Supply

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, February 2, 1949.

Sulphate of Ammonia

Several producers have raised the price to \$48.00 per ton, f.o.b. production points, but some of the largest producers are still maintaining the old price of \$45.00 per ton. Demand continues good from all sections.

Nitrate of Soda

Shipments were being made by both domestic producers and the importers and the material is shipped out by the importers as fast as boats arrive.

Ammonium Nitrate

One large producer has been forced to curtail production, due to a power shortage at point of production. Demand very heavy from all sections in spite of the fact that some midwest producers have increased their production.

Nitrogen Solutions

Shipments were being made by producers as fast as possible but most manufacturers find themselves short. Little change is looked for in the supply situation for the rest of this season.

Organics

Fertilizer organics were in some demand by fertilizer manufacturers as mixing operations became more intensified. Tankage was in demand at \$9.00 per unit of ammonia (\$10.94 per unit N), f.o.b. production points and both feed and fertilizer buyers bought. A few sales of blood were made at prices ranging from \$9.50 to \$9.75 (\$11.55 to \$11.85 per unit N), f.o.b. shipping points. Soybean meal and cottonseed meal were in demand from feed buyers, due to the heavy winter in the western section of the United States which has increased the demand for feed. Linseed meal producers were sold out for the

next 60 days and offerings were hard to locate.

Castor Pomace

This material was available for prompt shipment at \$24.00 per ton net, f.o.b. production point, which is a reduction of \$3.50 per ton. Demand has been poor recently but at the new low price increased interest has been shown by buyers.

Fish Meal

With the North Carolina fishing operations reported at an end for this season, the market for fish meal firmed up and offerings for quick shipment were scarce. Last sales of fish meal were made at \$160.00 per ton and some fish scrap sold at \$147.50 per ton.

Bone Meal

This material is almost impossible to buy for quick shipment and many fertilizer manufacturers who have not purchased their supplies will probably have to be without it this season. The production is off and the demand up, particularly from the feed trade. Very little foreign material was available.

Superphosphate

The supply situation is now considered to be normal, with the buyers having no difficulty in obtaining necessary supplies. In fact, at some producing points a surplus is reported. This situation will probably correct itself in another 30 days under the influence of heavy shipments, as the season gets under way.

Potash

One large producer contemplates shutting down production for a short period in about 30 days but other producers are maintaining shipments at a good rate. Demand still exceeds supply but is not quite as heavy as it was 60 days ago.

CHICAGO

Organic Materials Show Little Price Change. Sales Are for Immediate Delivery. Little Advance Buying

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, January 31, 1949.

There are no new developments in the market on animal ammoniates in the middle west. Prices remain practically unchanged and buying interest is keeping pace with production. In most instances, trading is confined to nearby delivery as buyers are still skeptical about taking a long-range position.

Digester tankage is quoted at \$120.00 per ton, sacked, and meat scraps at \$110.00 per ton, f.o.b. shipping points in both instances. Dry rendered tankage ranges from \$1.95 to \$2.00 per unit of protein, price variation depending upon freight involved. Unground wet rendered tankage and dried blood range from \$9.25 to \$9.75 per unit of ammonia (\$11.24 to \$11.85 per unit N). Steamed bone meal is quoted \$70.00 to \$75.00 per ton and raw bone meal around \$65.00 per ton.

CHARLESTON

Little Change in Materials Situation. Nitrogen and Potash Supply Short. Superphosphate Adequate. Some Price Increases Reported

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, January 31, 1949.

Nitrogen continues to be short of demand with tendency toward periodic increases in price by producers. Superphosphate is in easy supply and potash, though being shipped on schedule, continues short of demand.

Organics.—Little interest is shown in organics on the part of the fertilizer trade, due to the high cost per unit of ammonia, but the feed market continues steady and prices are firm at levels beyond reach of fertilizer manufacturers. Nitrogenous tankage is quoted at \$3.50 to \$4.00 per unit of ammonia (\$4.25 to

\$4.86 per unit N) in bulk, f.o.b. production points. Imported organics remain in the doldrums with practically no interest on the part of fertilizer manufacturers.

Castor Pomace.—The market is nominally \$24.00 per ton in bags, f.o.b. Northeastern production points for spring shipment. The heaviest movement is against existing contracts.

Dried Ground Blood.—Offerings continue light and the market is quiet around \$9.50 to \$9.75 per unit of ammonia (\$11.55 to \$11.85 per unit N), f.o.b. Chicago or New York.

Potash.—Demand for potash continues strong with movement from the mines on schedule. September production of potash in Bizonat, Germany, is reported showing an increase of 4,000 metric tons over the August production of 46,500 tons of K_2O .

Phosphate Rock.—Supplies are adequate to meet domestic buyers' demands and some acidulators are reported requesting a slow-down of shipments. Due to recent drops in the price of fuel oil, cost of phosphate rock to acidulators has been reduced in proportion.

Superphosphate.—No shortage of normal superphosphate exists but demand for triple superphosphate is in excess of supply. Prices continue steady.

Sulphate of Ammonia.—Production of synthetic technical sulphate of ammonia is reported during November at 23,073 tons, but demand continues far in excess of supply. It is reported that one producer is now asking \$47.00 per ton in bulk, f.o.b. production points, but most producers continue to price their material at \$45.00 per ton.

Ammonium Nitrate.—Demand for this high-nitrogen material continues strong with output available for domestic consumption insufficient to meet the total demand.

Nitrate of Soda.—The market continues

ESTABLISHED 1873

Woodward & Dickerson
Inc.

FERTILIZER AND FEED MATERIALS

BROKERS
COMMISSION MERCHANTS

GIRARD TRUST BUILDING

Cable Address: "WOODWARD"

IMPORTERS
EXPORTERS

PHILADELPHIA 2, PA., U. S. A.

Codes used: Acme, Benley's Complete, Appendix, Private

For all-round savings..
and all-round efficiency

BAUGHMAN

Belt and Bucket Elevator

CUTS HANDLING COSTS in rock phosphate storage plants. Teamed with screw conveyors, it fills both loading tank and storage tank direct from car or truck . . . also transfers from one tank to other. Capacity to 90 tons per hour . . . heights from 20' to 80'. Self-supporting and compact. Easy to set up . . . easy to move.

PROVEN LOW PRICE! Ruggedly built of standard 10' sections . . . eliminates high cost of custom-built installation. Production line savings are passed on to you!

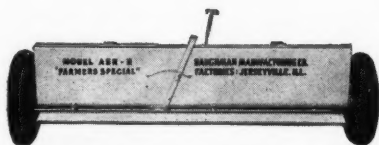


BAUGHMAN

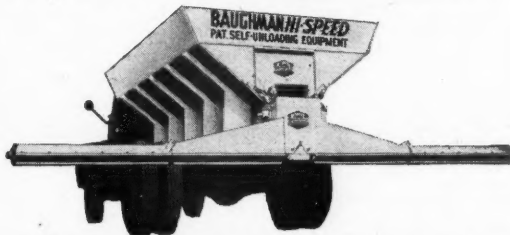
CONVEYORS

Two "HI-SPEED" portable conveyors to load and unload cars and trucks. Both handle large volumes efficiently and with dispatch . . . reduce manpower requirements. Write for full information on the Baughman Model 164 OPEN TROUGH BELT CONVEYOR and the Model Q SCREW CONVEYOR.

... and spreaders to meet any requirement!



"FARMERS SPECIAL" gives more even spreads under all conditions. Specialized agitation . . . convenient control features. First in the field with high tensile alloy steel construction. Available in 8' and 12' models. WRITE FOR FULL INFORMATION.



COMMERCIAL OPERATORS MAKE MONEY with this Baughman Self-Unloading Body. Speedily spreads large quantities of phosphate with Model 0-2 Phosphate Spreader. Spreader easily detached for spreading lime, unloading and spreading road rock, delivering coal and grain, etc. Thousands in use.



BAUGHMAN MANUFACTURING CO., Inc.

1221 Shipman Rd., JERSEYVILLE, ILL.

"There is a Baughman Distributor Near You"

WRITE TODAY
FOR FULL
INFORMATION

firm with demand exceeding supply, although shipping schedules for Chilean nitrate of soda are being kept.

Cal-Nitro.—As of February 1st, the producers will advance the price to \$42.00 per ton in bulk, and \$46.00 per ton in 100 pound paper bags, f.o.b. works. This material analyzes 20.5 per cent nitrogen.

PHILADELPHIA

Movement of Mixed Fertilizers Slower than Desired. Demand for Nitrogen Still Exceeds Supply. Superphosphate Ample

Exclusive Correspondence to "The American Fertilizer"

PHILADELPHIA, January 31, 1949.

Better movement of mixed goods out of the factories is now reported, but many consumers are still slow with their orders, and it is feared some of them will not be able to get all they need. The time will be too short within which to effect all deliveries. Chemical nitrogen still continues scarce. It is reported the price of Cal-Nitro will be advanced \$3.50 per ton on February 1st.

Sulphate of Ammonia.—Production continues inadequate to meet the demand and the market position is exceedingly tight. Resales are practically unheard of, and even the "drug-store" variety is scarce.

Nitrate of Soda.—Chilean arrivals continue according to schedule, and while production is said to have increased, requirements still continue ahead of supply. Recent advance in price has not slackened the demand.

Ammonium Nitrate.—Production continues behind requirements, and market position is exceedingly tight.

Castor Pomace.—Production is principally under contract, with limited offerings for nearby delivery at \$24.00 per ton, in bags, f.o.b. producing plants.

Blood, Tankage, Bone.—Blood and tankage show a somewhat easier tendency with the former at \$9.00 to \$9.50 per unit of ammonia (\$10.94 to \$11.55 per unit N), and tankage at \$8.75 to \$9.00 (\$10.63 to \$10.94 per unit N).

Bone meal continues very scarce with production practically all under contract, and no first hand offerings. Resale lots appear only at infrequent intervals. Hoof meal is quoted nominally at \$7.00 per unit of ammonia (\$8.51 per unit N) at Chicago.

Fish.—Menhaden meal, 60 per cent protein, is quoted \$147.50 to \$150.00 per ton, and 65 per cent grade at \$150.00 to \$155.00. Scrap was priced \$140.00 to \$142.50, with offerings limited.

Phosphate Rock.—Requirements are now being kept well filled, and accumulation of stock is again possible.

Superphosphate.—Deliveries on contracts are being made in greater volume, and additional tonnage could be supplied promptly if required. Prices remain unchanged.

Potash.—Contract shipments are moving steadily according to schedule, but production is still not up to the demand. Cotton hull ashes are available in sufficient quantity to meet the demand for this special form of potash.

Potato Price-Support Program for 1949

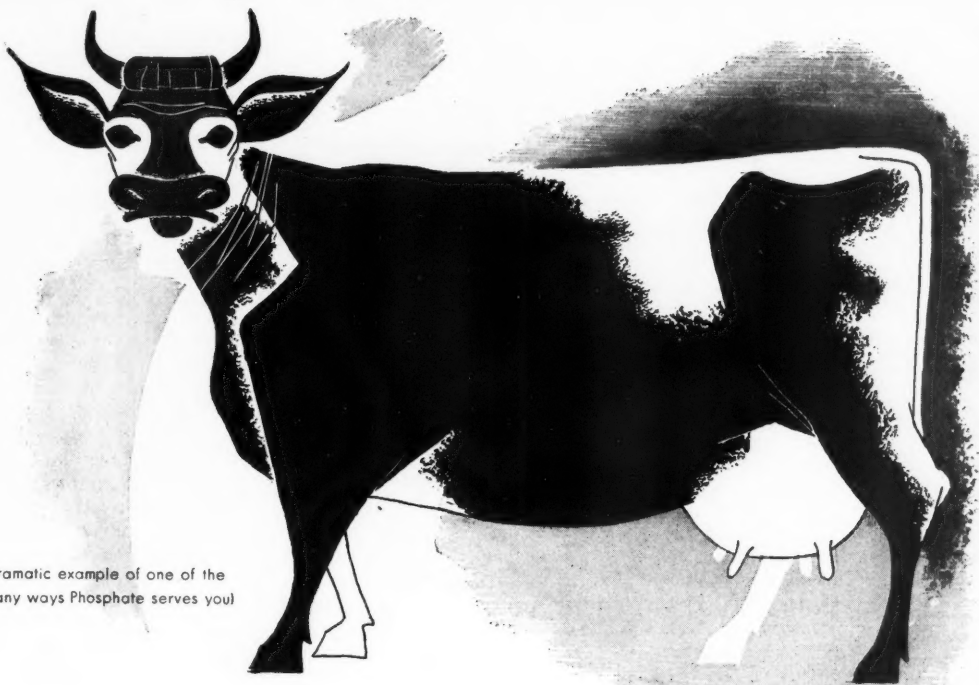
The 1949 Irish potato price-support program, announced by the U. S. Department of Agriculture, shows two major changes from the programs followed in previous years.

The principal change is the establishment of a single price as the base support-price for all eligible potatoes, in order to encourage movement of the better grades of potatoes into consumption through regular commercial channels and limit, insofar as possible, Government purchases to the lower grades. The other major change is the announcement at this time of the year of the complete price-support schedule by States for the entire potato crop.

In previous programs the support price has been based on an established price for U. S. No. 1 grade potatoes, with certain lower grades supported at 50 per cent of this price. The single support price for the 1949 potato

	FERTILIZER PLANT EQUIPMENT				
	<p><i>Dependable for Fifty Years</i></p>	<p>All-Steel Self-Contained Fertilizer Mixing Units</p>	<p>Batch Mixers— Dry Batching Pan Mixers— Wet Mixing</p>	<p>Swing Hammer and Cage Type Tallings Pulverizers</p>	<p>Vibrating Screens Dust Weigh Hoppers Acid Weigh Scales</p>
<p>STEDMAN'S FOUNDRY & MACHINE WORKS 505 Indiana Ave. AURORA, INDIANA, U.S.A.</p>					

MINERAL-RICH PHOSPHATE IS VITAL TO EVERYBODY EVERY DAY



(A dramatic example of one of the many ways Phosphate serves you)

A WONDERFUL CHEMIST, THE COW!

But, like the dairy industry, she too depends on Phosphate

Bossy, Queen of the Dairy Industry, is a manufacturing chemist of unusual achievement. She produces a really amazing amount of fine-flavored, nutritious milk, wonderfully enriched with Vitamin B. Yet she is not able to manufacture the essential minerals her system requires such as phosphorus and calcium to produce milk of consistently high quality.

So the dairy farmer protects Bossy against mineral deficiencies in her diet by the regular use of phosphate in the plant foods which promote the growth of nourishing pasture crops and silage. And in the mineral supplements which are added to her feeds.

Phosphate continues to guard the purity and nourishing goodness of milk as it flows from dairy farm to you. Phosphate, in the form of phosphate compounds, is extensively used in the detergents which are so essential in cleaning and purifying milk handling equipment in the dairy industry. And manufacturers of evaporated milk use disodium phosphate to improve the heat stability of milk during the sterilization process in order to give their products a uniform body.

International mines phosphate in Florida and Tennessee for plant foods, for livestock feed supplements and for the chemical manufacturers who produce phosphate compounds for the dairy industry and for many food, pharmaceutical and chemical purposes.



Florida Pebble Phosphate

ALL COMMERCIAL GRADES

Tennessee Phosphate

PHOSPHATE DIVISION



International Minerals & Chemical Corporation

General Offices: 20 North Wacker Drive, Chicago 6

price-support program averages \$1.80 per hundredweight for the season for all potatoes which qualify as U. S. No. 2 grade one and seven-eighths inch minimum or better. This price, which is based on the January 1, 1949, parity price is designed to insure support at 60 per cent of parity.

Announcement of the complete price-support schedule by States is made at this time of the year by the Department in order to give growers information on actual support prices as far as possible in advance of planting. During the last few years the support price for the early and intermediate crops has been based on the January 1 parity price and was announced in the winter, while the support price for the late crop has been based on the July 1 parity price and was not announced before July.

It is expected that the single price established for support of the 1949 crop will—in the event there is a surplus of potatoes—result in the poorer grades being delivered to the Department first and the better grades going into the commercial markets. In effect the only place in the U. S. No. 1 grade potato will command a premium price will be in the commercial market. Growers selling potatoes to the Department will still be required to deliver potatoes on a graded basis, however.

Under the previous programs, with a higher level of support on U. S. No. 1 grade potatoes, the non-complying grower could sell his No. 1 grade potatoes at prices slightly below the support level and market his lower grades at a price above the support level for these grades, thus receiving a higher total income than if he had remained within his acreage goal. At the same time, the potatoes of the non-complying grower—by depressing the market below the support level—made it difficult for the complying grower to market his No. 1 grade potatoes commercially at the support price. As a result, in order to carry out its responsibility under the law, the De-

partment was compelled to purchase and divert into other than normal commercial channels large quantities of top quality, top price potatoes.

Future Development of the Radioactive Research Program

(Continued from page 10)

We know quite well that superphosphate undergoes many reactions in the manufacture of mixed fertilizers. The nature and extent of those reactions depend on the method of formulation and conditions of storage. What influence they have on the availability of phosphorus to crops has not been determined. We are hopeful that it can be determined by isotopic methods. Future research will be directed to this problem. The crop utilization investigations will be integrated with chemical studies on fertilizer formulation and storage.

Probably the next radioactive elements to be used in field experiments will be calcium and sulphur. Initial field experiments with these elements will be started in 1950. Fertilizers carry calcium in several forms—calcium phosphates, calcium sulphate, and as dolomite. Sulphur is in the form of calcium sulphate, ammonium sulphate, and potassium sulphate. The extent to which these sources are utilized by crops should be determined.

As indicated in an earlier paper, normal superphosphate contains about 20 per cent calcium oxide (CaO) and 30 per cent sulphur trioxide (SO₃), as well as 20 per cent phosphoric acid (P₂O₅). Its value in crop production cannot be attributed solely to phosphorus. Experiments, therefore, will be conducted to determine by isotopic methods the utilization of both calcium and sulphur in superphosphate by various crops under different conditions.

The applied research program will certainly include liming experiments in order to secure a direct measurement of the utilization of applied calcium. As in the case of phosphorus,

THE DAVIDSON COMMISSION CO. —BROKERS—

TALLOW—GREASES—STEARINES

FERTILIZER AND ANIMAL FEED MATERIALS

VEGETABLE OILS—ANIMAL OILS

FATTY ACIDS—FISH OIL AND FISH MEAL

ANIMAL GLANDS AND GLANDULAR DERIVATIVES

UTILITIES BUILDING—327 SOUTH LA SALLE STREET

CHICAGO 4, ILL.

Telephone
WABASH 2604

Codes Used
ROBINSON
CROSS
KELLY-YOPP
TELETYPE CGO 1051

ALEX. M. McIVER

Established 1915

H. H. McIVER

ALEX. M. McIVER & SON

BROKERS

SPECIALIZING

- Sulphuric Acid
- Nitrogenous Materials
- Blood and Fertilizer Tankage
- Phosphate Rock
- Bone Meals
- Oil Mill Products
- High Testing Dolomitic Lime
- "Riceland" Ground Rice Hulls
- Ammoniated Base and Superphosphate

Representatives Virginia Carolina Chemical Corporation Bag Department
Burlap Bags Cotton Bags

SOUTH AMERICAN FERTILIZER MATERIALS

Peoples Office Building

Phones: Local 2-4627—L. D. 921-922

Charleston, S. C.

Ashcraft-Wilkinson Co.

*Fertilizer
Materials*



*Feeding
Materials*

ALL FERTILIZER MATERIALS

FOREIGN AND DOMESTIC

Ammonium Nitrate

Sulphate of Ammonia

Organic Ammoniates

Sulphur

Exclusive Distributors: DUVAL TEXAS SULPHUR

Vegetable Oil Meals and Feedstuffs

HOME OFFICE: ATLANTA, GA.

BRANCHES:
NORFOLK, VA.
CHARLESTON, S. C.
JACKSON, MISS.
TAMPA, FLA.

CABLE ADDRESS:
ASHCRAFT

SUBSIDIARIES:
INTERSTATE MILLS, INC.
CAIRO, ILL.
INTERSTATE WAREHOUSE
MOUNDS, ILL.

variables will probably include rates, placements, and materials in relation to soils and crops. Unlike radioactive phosphorus, which can only be followed during one season, the utilization of one application of radioactive calcium can be followed five or more seasons. Unfortunately the radioactive isotopes of magnesium are not of such a nature as to make possible studies on the utilization of magnesium in dolomite by isotopic methods.

Applied research with minor elements will probably develop along the lines indicated for phosphorus, calcium, and sulphur. In addition the experiments will include spray applications to foliage and studies of translocation in the plant, especially in tree crops.

Organization and Facilities

This research program from the very beginning has been developed by the Bureau and State agricultural experiment stations with the counsel and support of the Phosphate Research Committee of the fertilizer industry. That arrangement has many advantages. It often becomes difficult, however, to give proper credit to men making important contributions to the work, but the advantages far outweigh such difficulties.

The special facilities required in this work have been developed with the project. The \$31,000 contributed by members of the fertilizer industry during the last two years has been largely used to provide essential facilities. These include equipment for the manufacture of different radioactive phosphates and facilities for the assay of radioactive phosphorus in plant material.

The Bureau and the Atomic Energy Commission have recently completed arrangements whereby the Commission will support a strong development and fundamental research program with isotopes at the Plant Industry Station. Special greenhouse and laboratory facilities will be constructed, and our facilities for the manufacture of radioactive fertilizers will be expanded. The Bureau, therefore, will be in a position to sup-

ply radioactive fertilizers and related materials to research agencies authorized to use them by the Atomic Energy Commission. The AEC project makes possible a very considerable expansion of the development and fundamental research that is so essential for the application of isotopic techniques to agricultural problems.

This expansion in developmental and fundamental research will make possible a steady increase in the application of isotopic methods to fertilizer, soil management and fertility, and crop production problems. As plans for such work are formulated, the following points should be considered:

1. The amount of information derived from radioactive fertilizer experiments is often several-fold greater than for most fertilizer experiments—and the cost of such experiments is also several-fold greater.

2. A large amount of this applied research in the fields of soil fertility and management will be conducted by the State agricultural experiment stations. The Bureau will cooperate by furnishing radioactive fertilizers; and both Beltsville and field stations will assist and participate in such work to a limited extent.

3. Currently only a few States have the essential facilities and trained personnel for this work.

This situation affords the industry and the Phosphate Research Committee a further opportunity to effectively support the cooperative research program. We hope such support will include the advice and cooperation of industry agronomists. They have had a very constructive influence on several lines of soil and fertilizer investigations. We invite them to participate in these studies and to see that isotopic methods are used where they can most effectively contribute to the solution of practical problems.

CLASSIFIED ADVERTISEMENTS

Fertilizer Salesman, 20 years with one of the largest fertilizer raw materials industry. Experienced sales, traffic also accounting. Single, now New York. Available immediately. Address "260," care THE AMERICAN FERTILIZER, Philadelphia 3, Pa.

BREWERY VATS FOR SALE

White Oak Brewery Vats (Used) four 160-bbl. capacity; twenty-six 85-bbl. capacity; suitable for water tanks, silos, storage, etc.

For full particulars and price write Union Brewing Company, 506-528 Sampson St., New Castle, Pa.

FELIX KRAMARSKY CORPORATION

FERTILIZERS

39 Broadway, New York 6, N. Y.



LET'S BRING THIS DOWN TO EARTH

Quality is a term that is often used broadly, casually. In the case of Chase, quality means more efficient, more economical, and more attractive containers for your products. And here's why:

Chase has been manufacturing bags for more than 100 years—and every year has marked some important improvement: in construction, in design, in printing, or in packaging technique!

Result: you get dependability, positive protection, and you get double-barreled satisfaction, too: 1) when your product is shipped, 2) when your product is received.

There is a Chase bag for every need—write us today for complete details.



Chase
Multwall
Paper Bags



Chase
Topmill
Burlap Bags



Chase
Lillipack
Paper Bags



Chase Sax-
olin Open
Mesh Bags



Chase Specialties:
Mailing Bags, Spi-
ral Tubing, Twines



COTTON BAGS — ALL SIZES



Chase Lined
and Combined
Bags



Chase
Pretty Print
Cotton Bags



Chase Liners—
Crimpled and
Pleated

CHASE BAG CO.

GENERAL SALES OFFICES, 309 WEST JACKSON BLVD., CHICAGO 6, ILL.

BOISE • DALLAS • TOLEDO • DENVER • DETROIT • MEMPHIS • BUFFALO • ST. LOUIS • NEW YORK • CLEVELAND • MILWAUKEE
PITTSBURGH • KANSAS CITY • LOS ANGELES • MINNEAPOLIS • GOSHEN, IND. • PHILADELPHIA • NEW ORLEANS • ORLANDO, FLA. • SALT LAKE CITY
OKLAHOMA CITY • PORTLAND, ORE. • REIDSVILLE, N.C. • HARLINGEN, TEXAS • CHAGRIN FALLS, O. • HUTCHINSON, KAN. • CROSSETT, ARK.

Effect of Ammonium Nitrate on Oklahoma Corn Production

(Continued from page 11)

yield from an application of 50 pounds of ammonium nitrate over a starter fertilizer in those experiments was 9.0 bushels per acre. One hundred pounds of ammonium nitrate produced 3.6 bushels more than 50 pounds, and 150 pounds of ammonium nitrate produced 4.1 bushels more than 100 pounds. Heavy rates of nitrogen fertilization should not be applied unless the physical condition of the soil is very favorable for moisture storage and deep root development. More nitrogen can be used profitably on soils which have a lower natural producing capacity than on soils which produce a higher yield without fertilization, provided the subsoil is favorable

for moisture movement and root penetration. A profitable response from the fertilization of corn will not be obtained on shallow soils under normal conditions in Oklahoma.

On bottomland soils high in available phosphorus and available potassium, only nitrogen will be needed to increase yields. In some areas all of the nitrogen may be applied as a side-dressing. A part of the nitrogen should be applied in the row at the time corn is planted to hasten early growth when late winter rains leach the soil of soluble nutrients and cold wet weather retards the decomposition of soil organic matter.

Recommendations for the Fertilization of Corn in 1949

When legumes are not grown in the cropping system and corn will be planted on deep sandy upland or bottomland soils low in avail-

TABLE I
EFFECT OF AMMONIUM NITRATE APPLIED AS A SIDE-DRESSING
ON CORN FERTILIZED WITH A STARTER FERTILIZER AT PLANTING

Name, Location and Soil Type	Starter Fertilizer		Starter Fertilizer	Pounds of Ammonium Nitrate Applied as a Side-dressing; Plus Starter Fertilizer			Date Side-Dressed
	Grade Used	Per Acre		50	100	150	
L. E. Biles, Mannville, Johnston County							
Teller fine sandy loam.....	4-12-4	80	20.3 ^a	27.8 ^a	31.7 ^a	39.0 ^a	May 13
Doyle Pryor, Mannville, Johnston County							
Dougherty fine sandy loam.....	4-12-4	100	24.5	36.2	37.4	42.7	May 12
J. S. Smith, Mannville, Johnston County							
Teller fine sandy loam.....	4-12-4	110	24.9 ^b	39.4 ^b	42.1 ^b	46.8 ^b	May 13
W. H. Hathaway, Tishomingo, Johnston County							
Bowie very fine sandy loam.....	4-12-4	125	7.8	18.1	30.8	35.9	May 12
Kenneth Eggenburg, Ravia, Johnston County							
Vanoss silt loam.....	4-12-4	100	14.1 ^b	25.5 ^b	28.7 ^b	34.6 ^b	May 13
Darold Butler, Pauls Valley, Garvin County							
Reinach very fine sandy loam.....	5-10-5	125	76.7	84.1	84.0	90.0	May 27
Gus Shi, Stratford, Garvin County							
Verdigris silt loam.....	4-12-4	200	40.9	50.7	51.3	57.6	May 28
Gus Shi, Stratford, Garvin County							
Bethany silt loam.....	4-12-4	200	61.3 ^c	63.7 ^c	69.7 ^c	66.2 ^c	May 27
Nelson Brensing, Skedee, Pawnee County							
Vanoss silt loam.....	8-20-0	75	29.6	35.7	37.8	—	May 13
Okla. Agr. Exp. Sta., Perkins, Payne County							
Vanoss fine sandy loam.....	0-20-0	150	36.8	—	53.3	—	May 15
Okla. Agr. Exp. Sta., Perkins, Payne County							
Norge fine sandy loam.....	0-15-12	200	24.6	—	47.1 ^d	—	April 4
Allen Nichols, Hugo, Choctaw County							
Ruston fine sandy loam.....	4-12-4	150	18.5	—	50.0	—	June 1
W. A. Jackson, Spencerville, Choctaw County							
Norfolk fine sandy loam.....	5-10-5	150	12.6	—	28.0	—	June 1
O. W. Hamby, Grant, Choctaw County*	5-10-5	200	14.7	—	32.9	—	
J. L. Massengale, Boswell, Choctaw County*	5-10-5	175	21.0	—	28.3	—	
Roy Floyd, Spiro, LeFlore County*	5-10-5	200	19.4	—	50.0	—	
Melburn Cowan, Spiro, LeFlore County*	5-10-5	180	25.4	—	36.4	—	
Everett Strain, Spiro, LeFlore County*	5-10-5	200	13.8	—	33.2	—	
Paul Semans, Spiro, LeFlore County*	5-10-5	150	38.4	—	46.0	—	

* Soil type not determined.

^a Two rows of corn and one of peas rate only 2/3 of that indicated.

^b One row of corn and one of peas.

^c Winter legumes seed crop produced on this land in 1947.

^d Ammonium nitrate side-dressed at planting.



A NEW NAME FOR A POPULAR CONDITIONER

A Popular Organic Conditioner

FUR-AG is an inexpensive organic conditioner. It speeds up curing in the pile, helps prevent mixed goods from caking, and provides bulk. Heated to 350° F for several hours in the presence of small amounts of steam and acid, FUR-AG is freed from plant diseases, insects, seeds, and other similar contaminants. It is being used by leading fertilizer manufacturers. FUR-AG is produced and available in volume the year around. More complete information on request.



The Quaker Oats Company

CHEMICALS DEPARTMENT

1895 Board of Trade Bldg.

141 West Jackson Blvd.

Chicago 4, Illinois

Keyed SERVICE!

Fertilizer plants all over the country—large and small—state their needs and we meet them. Large stocks of seasoned materials and ample modern production facilities enable us to make prompt shipments.

TRIPLE SUPERPHOSPHATE

46 to 48% Available Phosphoric Acid

We also manufacture
HIGH-GRADE SUPERPHOSPHATE

U. S. Phosphoric Products

Division

TENNESSEE CORPORATION

Tampa, Florida

New York Office:

61 Broadway

Washington, D. C.

440 The Woodward Bldg.

Sales Agents:

Bradley & Baker

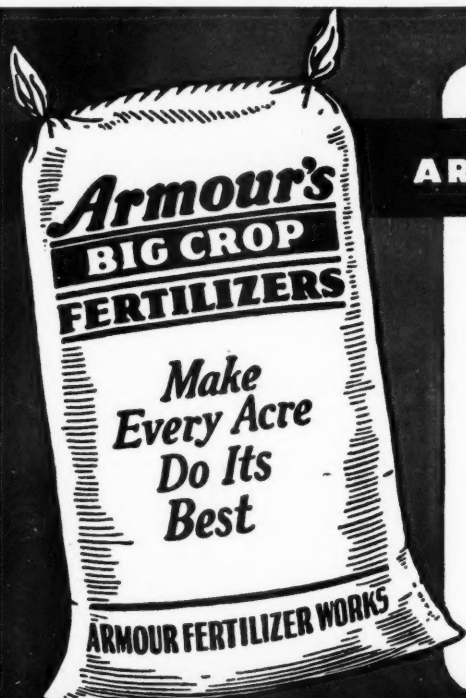
155 East 44th St.

New York, N. Y.

A Mark of



Reliability



ARMOUR FERTILIZER WORKS

General offices:

**HURT BUILDING
ATLANTA, GA.**

MAILING ADDRESS: P.O. BOX 1685, ATLANTA 1, Ga.

Division offices:

Birmingham, Ala.
Montgomery, Ala.
Jacksonville, Fla.
Albany, Ga.
Atlanta, Ga.
Augusta, Ga.
Columbus, Ga.
Chicago Heights, Ill.
East St. Louis, Ill.
New Orleans, La.
Presque Isle, Me.

Baltimore, Md.
New York, N. Y.
Greensboro, N. C.
Wilmington, N. C.
Cincinnati, Ohio
Sandusky, Ohio
Columbia, S. C.
Nashville, Tenn.
Houston, Tex.
Norfolk, Va.
Havana, Cuba

San Juan, Puerto Rico

able phosphorus, apply 150 to 200 pounds per acre of a starter fertilizer such as 4-16-0, 4-12-4 or 5-10-5 in the row when early maturing adapted hybrid seed corn is planted. The 4-16-0 should be used only on high potash soils. Side-dress the corn about May 10th to May 20th with 50 to 100 pounds of ammonium nitrate per acre. If equipment for side-dressing is not available, the ammonium nitrate can be applied with the fertilizer attachment on the corn planter. The runners of the corn planter should be set to penetrate about three inches deep. Allow the fertilizer to drop to the bottom of the furrow by removing any equipment which normally keeps the fertilizer from coming in direct contact with the seed. Move the hitch about 10 or 12 inches off center on the draw bar of the tractor, or drive a team so that the fertilizer will be applied about 10 or 12 inches from the corn row. If the fertilizer is applied with a side-dressing attachment on a cultivator, it should be dropped in a furrow behind the second shovel, which will be about 12 inches from the corn row. A straight shovel should be used in place of a sweep to make a furrow about three or four inches deep. Replace the

straight shovel with a sweep for later cultivations so that corn roots which develop in the fertilized zone will not be disturbed.

Spacing of Plants

Early maturing hybrid corn should be planted about 15 inches apart on deep, well drained soil to produce good yields under average conditions and also to provide some protection against normal drought periods. If the average distance between early or medium maturing corn plants is approximately 18 inches, a yield of about 50 bushels per acre can be produced under favorable soil and climatic conditions. A wider spacing of such plants will not permit the roots to efficiently utilize the fertilizer applied and a maximum yield will not be obtained.

Legumes and Irrigation

Legumes can be grown in a cropping system to supply a high percentage of the nitrogen needed to increase corn yields on many low nitrogen soils. Where water is available for irrigation, plant seed of a late maturing hybrid about eight inches apart in the row and fertilize with 300 pounds per acre of a starter fertilizer and side-dress with 300 pounds of

TABLE 2
EFFECT OF AMMONIUM NITRATE APPLIED AS A SIDE-DRESSING
AND/OR AT PLANTING ON CORN PRODUCTION

Name, Location and Soil Type	No Ferti- lizer	Ammon- ium Nitrate 50 lbs. at Planting	Ammonium Nitrate Side-dressi g			Ammonium Nitrate 50 lbs. at planting Plus side-dressing			Date of Side- Dress- ing
			50 Lbs.	100 Lbs.	150 Lbs.	50 Lbs.	100 Lbs.	150 Lbs.	
Nelson Brenging, Skedee, Pawnee County									
Yahola fine sandy loam.		35.3	—	—	—	35.8	44.9	43.2	May 23
Reinach very fine sandy loam. .	39.2	—	42.7	54.1	52.4	—	56.3	60.5	May 23
Bob Colomb, Fairfax, Osage County									
Portland very fine sandy loam. .	52.1	—	59.6	59.3	60.2	—	—	—	May 18
James Parsons, Goodland, Bryan County									
Denton clay loam.	26.0	—	—	40.0	—	—	—	—	May 20
Brooks Ledbetter, Pryor, Mayes County									
Bates very fine sandy loam. . .	21.2*	—	27.3	28.0	26.0	—	—	—	June 5

* This soil side-dressed with a complete fertilizer and potash produced 38.1 bushels per acre.

SOUTHERN LEAD BURNING COMPANY

SULPHURIC ACID CHAMBER PLANTS—Box Type or Water Cooled
LEAD ACID SYSTEMS FOR ACIDULATING PLANTS
GLOVER OR GAY LUSSAC TOWERS, ACID COOLERS, etc.
LEAD BURNERS FURNISHED FOR REPAIR WORK

P. O. BOX 4627, ATLANTA 2, GEORGIA

Phone: WALNUT 2576

Call for Fulton!



FOR QUALITY BAGS

Burlap and Cotton Bags
Waterproof Paper Lined Textile Bags
Multiwall Paper Bags
Eagle Sail Cotton Twine



BAG & COTTON MILLS

Atlanta * St. Louis * Dallas
Kansas City (Kans.) * New
York * Minneapolis * New
Orleans * Denver * Los Angeles

KENT MILL COMPANY

60 BOWNE ST., BROOKLYN 31, N. Y.

CRUSHING, GRINDING, PULVERIZING,
AND AIR SEPARATING MACHINERY.

FOR

LIMESTONE, GYPSUM, BARYTES, PHOSPHATE
ROCK AND OTHER MATERIALS

**Need An
ACID
PLANT?**

CONSULT

CHEMICO

CHEMICO service covers every detail in the design and construction of an acid plant. Backed by over a quarter of a century's experience, Chemico's well-qualified engineers take charge of each step . . . from the design of the plant to the training of operating personnel. *Performance Guarantees* provide assurance that your completed plant will operate efficiently and economically. A consultation involves no obligation.

CHEMICAL CONSTRUCTION CORPORATION

Empire State Bldg., 350 Fifth Ave., New York 1, N. Y.



Mixed Fertilizers • Sulphuric Acid • Cleansers
Superphosphates • Phosphorus • Burlap and Cotton Bags
Triple Superphosphate • Phosphoric Acids • Vicara Textile Fibers
Phosphate Rock • Calcium and Sodium Phosphates • Zycon Fiber
"Black Leaf" Products — Pesticides

VIRGINIA-CAROLINA CHEMICAL CORPORATION Home Office: Richmond, Va.

ammonium nitrate per acre. This procedure should produce more than 100 bushels of corn per acre on deep bottomland soils if water is applied to supplement normal rainfall during July.

Fertilizer Tag Sales for 1948

(Continued from page 14)

Change in Seasonal Pattern of Fertilizer Tag Sales

It is interesting to compare the present seasonal distribution of sales with that of, say, ten years ago. Last year about 55 per cent of total sales occurred during the first four months—the reason, of course, being the farmers' demands for fertilizer for use in their spring planting. During the summer months sales fell off, but the last three months' sales accounted for 20 per cent of the total. A substantial part of the sales in the fourth quarter probably represented early buying on the part of the farmers, a practice which has long been encouraged by both the U. S. D. A. and the fertilizer industry. Ten years ago, however, the picture was entirely different. In 1938, sales during March and April accounted for over 50 per cent of the total, while sales for the first four months of the year represented about 74 per cent. Sales during the last three months of the year comprised 9.5 per cent, or slightly more than the percentage represented by December sales for 1948. The change during this ten year period is notable and indicates the fine co-operative spirit between farmers and the industry.

Sales in Southern States above 1947

The ten Southern States reported total equivalent sales of 7,245,000 tons, an increase of four per cent from 1947. Compared with the record high of 7,353,000 tons for 1946, however, they were slightly lower. During 1948 six of these States reported

increases over the preceding year; the four States recording decreases, however, were those where relatively large quantities of fertilizer are used. In three of these States—Virginia, North Carolina and Florida—1948 marked the second consecutive year in which equivalent sales had fallen. The greatest tonnage for any of the 14 States, 1,550,000, was registered for North Carolina, with Georgia, Alabama and Indiana following in that order.

Midwestern Area Reports New Peak

Sales in the four Midwestern States reached a new high of 2,007,000 tons, a 23 per cent increase over the 1,637,000 tons for 1947, the previous record high. Compared with the 1935–1939 average of 434,000 tons, sales for 1948 were over three and one-half times greater. Sales in these four States represented almost 22 per cent of the total for all 14 States requiring monthly tax tags, compared with 19 per cent for 1947 and nine per cent for the 1935–1939 average. Individually, each State recorded an increase over 1947, the gains ranging from two per cent for Kansas to 63 per cent for Missouri.

Radioactive Fertilizers Discussed

(Continued from page 8)

cultural Engineering, outlined new research work to be taken. Dr. Parker's talk is given in full in this issue.

L. T. Alexander, U. S. D. A., presented data collected from experiments where radioactive materials were tested as plant stimulants. Data from Beltsville and from 13 cooperating state agricultural experiment stations showed no beneficial effects for radioactive materials as plant stimulants. Neither was there any indication that the quality of the crops was improved. It was stressed that this type of research was in no way associated with the use of radioactive isotopes as research tools.

THE BRADLEY HERCULES MILLS

AND GRIFFIN MILLS

For Fine or Semi-Fine Grinding of

PHOSPHATE ROCKS and LIMESTONE

Capacities 1 to 50 Tons Per Hour

Catalogs Mailed on Request

BRADLEY PULVERIZER COMPANY

Allentown, Penna.

**TRIPLE & SUPER
PHOSPHATE
PHOSPHORIC ACID**

**PLANTS
& DESIGNS**



**NICOLAY TITLESTAD
CORPORATION**
11 West 42nd Street
New York 18, N. Y.

KNOW - - - -

- - TO A CERTAINTY

the number of pounds of raw material for a desired per cent. of plant food in a ton of mixed goods—or find what per cent. of a certain plant food in a ton of fertilizer produced by a specific quantity of raw materials.

No mathematical calculations are necessary. You can find the figures in a few seconds with the aid of

Adams' Improved Pocket Formula Rule

A Great Convenience for the Manufacturer of High Analysis Goods



To make clearer its use, answers to such problems as the following can be quickly obtained:

How much sulphate of ammonia, containing 20 per cent. of nitrogen, would be needed to give $4\frac{1}{2}$ per cent. nitrogen in the finished product?

Seven hundred and fifty pounds of tankage, containing 8 per cent. phosphoric acid are being used in a mixture. What per cent. of phosphoric acid will this supply in the finished goods?

Should the Adams' Formula Rule become soiled from handling, it may be readily cleaned with a damp cloth.

PRICE
\$1.25

TO BE SENT
WITH ORDER.

Special quotations
on twelve or
more.

Ware Bros. Company

Sole Distributors

1900 Chestnut St. :: PHILADELPHIA



Your employees want to help you build security

HERE'S HOW 7,500,000 WORKERS ARE DOING IT

More than 20,000 companies now maintain the Payroll Savings Plan, by which their employees invest in U. S. Savings Bonds automatically every pay day. This Plan builds security not only for the individual employees, but for their companies and for the nation!

As you know, Savings Bonds pay \$4 at maturity for every \$3 invested. Thus they help create a "rainy-day" fund for each Payroll Saver, increasing his security.

How P.S.P. helps employers

America's leading corporations report these company benefits from the Payroll Savings Plan: As Bonds increase the worker's economic peace of mind, plant morale improves. Production increases—because absenteeism, labor turnover, and the accident rate all decline. Relations improve between employer and employee.

Savings Bond dollars are dollars removed from the spending stream. They are deferred purchasing power—an assurance of good business during the years to come. The Treasury uses net Savings Bond dollars to help reduce inflationary credit potential in the banking system by retiring short-term bank-held Federal securities. So Bonds increase the nation's economic security, too!

Proof that employees want P.S.P.

Even with today's high prices, it has been proved that between 40% and 60% of America's working millions—at any wage level—can and will buy Bonds through Payroll Savings if management sponsors the Plan and a fellow worker asks them to sign up.

It's up to you whether they get the chance. All the help you need is available from your State Director, U. S. Treasury Department, Savings Bonds Division.



The Treasury Department acknowledges with appreciation
the publication of this message by

THE AMERICAN FERTILIZER

This is an official U. S. Treasury advertisement prepared under the auspices
of the Treasury Department and the Advertising Council.

BUYERS' GUIDE • A CLASSIFIED INDEX TO ALL THE ADVERTISERS IN "THE AMERICAN FERTILIZER"

AMMONIA—Anhydrous and Liquor

Commercial Solvents Corp., New York City
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM NITRATE

Lion Oil Co., El Dorado, Ark.
Spencer Chemical Co., Kansas City, Mo.

BAG MANUFACTURERS—BURLAP

Bemis Bros. Bag Co., St. Louis, Mo.
Chase Bag Co., Chicago, Ill.
Fulton Bag & Cotton Mills, Atlanta, Ga.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAG MANUFACTURERS—Cotton

Bemis Bro. Bag Co., St. Louis, Mo.
Chase Bag Co., Chicago, Ill.
Fulton Bag & Cotton Mills, Atlanta, Ga.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAG MANUFACTURERS—Paper

Bemis Bro. Bag Co., St. Louis, Mo.
Chase Bag Co., Chicago, Ill.
Fulton Bag & Cotton Mills, Atlanta, Ga.
Hammond Bag & Paper Co., Welisburg, W. Va.
International Paper Co., Bagpak Div., New York City
Jaite Company, The, Jaite, Ohio
Raymond Bag Co., Middletown, Ohio
St. Regis Paper Co., New York City

BAGS—Dealers and Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.
Huber & Company, New York City
McIver & Son, Alex. M., Charleston, S. C.

BAG CLOSING MACHINES

St. Regis Paper Co., New York City

BAG PRINTING MACHINES

Schmutz Mfg. Co., Louisville, Ky.

BAGGING MACHINES—For Filling Sacks

Atlanta Utility Works, The, East Point, Ga.
St. Regis Paper Co., New York City
Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Company, Boston, Mass.

BONE BLACK

American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Huber & Company, New York City

BONE PRODUCTS

American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Davidson Commission Co., The, Chicago, Ill.
Huber & Company, New York City
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BORAX AND BORIC ACID

American Potash and Chem. Corp., New York City

BROKERS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Davidson Commission Co., The, Chicago, Ill.
Huber & Company, New York City
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BUCKETS—For Hoists, Cranes, etc.

Hayward Company, The, New York City

BUCKETS—Elevator

Baughman Manufacturing Co., Jerseyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CARS AND CARTS

Atlanta Utility Works, The, East Point, Ga.
Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CHEMICALS

American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Commercial Solvents Corp., New York City
Davison Chemical Corporation, Baltimore, Md.
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Spencer Chemical Co., Kansas City, Mo.
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

CHEMISTS AND ASSAYERS

Gascoyne & Co., Baltimore, Md.
Shuey & Company, Inc., Savannah, Ga.
Wiley & Company, Baltimore, Md.

CONDITIONERS

Arkansas Rice Growers Corp. Assn., Stuttgart, Ark.
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
Quaker Oats Company, Chicago, Ill.

COTTONSEED PRODUCTS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

CYANAMID

American Agricultural Chemical Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City

DRYERS

Sackett & Sons Co., The A. J., Baltimore, Md.

ENGINEERS—Chemical and Industrial

Chemical Construction Corp., New York City
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

Titlestad Corporation, Nicolay, New York City

FERTILIZER (Mixed) MANUFACTURERS

American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Minerals & Chemical Corporation, Chicago, Ill.
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Virginia-Carolina Chemical Corp., Richmond, Va.

FISH SCRAP AND OIL

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

FOUNDERS AND MACHINISTS

Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Machine Works, Aurora, Ind.

A Classified Index to Advertisers in
"The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the
Advertisers, see page 33

HOPPERS

Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

IMPORTERS, EXPORTERS

Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES

American Agricultural Chemical Co., New York City

LEAD BURNERS

Southern Lead Burning Co., Atlanta, Ga.

LIMESTONE

American Agricultural Chemical Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.

LOADERS—Car and Wagon

Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making and Handling

Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Ammoniating

Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Elevating and Conveying

Atlanta Utility Works, The, East Point, Ga.
Baughman Manufacturing Co., Jerseyville, Ill.
Hough Co., The Frank G., Libertyville, Ill.
Hayward Company, The, New York City
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Grinding and Pulverizing

Atlanta Utility Works, The, East Point, Ga.
Bradley Pulverizer Co., Allentown, Pa.
Kent Mill Co., Brooklyn, N. Y.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Material Handling

Atlanta Utility Works, The, East Point, Ga.
Baughman Manufacturing Co., Jerseyville, Ill.
Hayward Company, The, New York City
Hough Co., The Frank G., Libertyville, Ill.
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Mixing, Screening and Bagging

Atlanta Utility Works, The, East Point, Ga.
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Power Transmission

Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Superphosphate Manufacturing

Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MANGANESE SULPHATE

McIver & Son, Alex. M., Charleston, S. C.

MINOR ELEMENTS

Tennessee Corporation, Atlanta, Ga.

MIXERS

Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

NITRATE OF SODA

American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.

NITROGEN SOLUTIONS

Lion Oil Company, El Dorado, Ark.
Spencer Chemical Co., Kansas City, Mo.

NITROGENOUS ORGANIC MATERIAL

American Agriculture Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Davidson Commission Co., The, Chicago, Ill.
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray

Monarch Mfg. Works, Philadelphia, Pa.

PHOSPHATE ROCK

American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Virginia-Carolina Chemical Corp., Richmond, Va.

PLANT CONSTRUCTION—Fertilizer and Acid

Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monsanto Chemical Co., St. Louis, Mo.
Sackett & Sons Co., The A. J., Baltimore, Md.
Southern Lead Burning Co., Atlanta, Ga.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Titlestad Corporation, Nicolay, New York City

POTASH SALTS—Dealers and Brokers

American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City

POTASH SALTS—Manufacturers

American Potash and Chem. Corp., New York City
Potash Co. of America, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
United States Potash Co., New York City

PRINTING PRESSES—Bag

Schmutz Mfg. Co., Louisville, Ky.

PYRITES—Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.

REPAIR PARTS AND CASTINGS

Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

BUYERS' GUIDE

- Stedman's Foundry and Mach. Works, Aurora, Ind.
- SCALES—Including Automatic Bagging**
 Atlanta Utility Works, The, East Point, Ga.
 Sackett & Sons Co., The A. J., Baltimore, Md.
 Stedman's Foundry and Mach. Works, Aurora, Ind.
- SCREENS**
 Atlanta Utility Works, The, East Point, Ga.
 Link-Belt Co., Chicago, Ill.
 Sackett & Sons Co., The A. J., Baltimore, Md.
 Stedman's Foundry and Mach. Works, Aurora, Ind.
 Sturtevant Mill Company, Boston, Mass.
- SEPARATORS—Air**
 Kent Mill Co., Brooklyn, N. Y.
 Sackett & Sons Co., The A. J., Baltimore, Md.
 Sturtevant Mill Co., Boston, Mass.
- SPRAYS—Acid Chambers**
 Monarch Mfg. Works, Inc., Philadelphia, Pa.
- SULPHATE OF AMMONIA**
 American Agricultural Chemical Co., New York City
 Armour Fertilizer Works, Atlanta, Ga.
 Ashcraft-Wilkinson Co., Atlanta, Ga.
 Baker & Bro., H. J., New York City
 Huber & Company, New York City
 Jackle, Frank R., New York City
 McIver & Son, Alex. M., Charleston, S. C.
 Woodward & Dickerson, Inc., Philadelphia, Pa.
- SULPHUR**
 Ashcraft-Wilkinson Co., Atlanta, Ga.
- SULPHURIC ACID**
 American Agricultural Chemical Co., New York City
 Armour Fertilizer Works, Atlanta, Ga.
 Ashcraft-Wilkinson Co., Atlanta, Ga.
 Baker & Bro., H. J., New York City
 Huber & Company, New York City
 International Minerals & Chemical Corporation, Chicago, Ill.
 McIver & Son, Alex. M., Charleston, S. C.
 Southern States Phosphate Fertilizer Co., Savannah, Ga.
 U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
 Virginia-Carolina Chemical Corp., Richmond, Va.
- SUPERPHOSPHATE**
 American Agricultural Chemical Co., New York City
 Armour Fertilizer Works, Atlanta, Ga.
 Ashcraft-Wilkinson Co., Atlanta, Ga.
 Baker & Bro., H. J., New York City
 Davison Chemical Corporation, Baltimore, Md.
 Huber & Company, New York City
 International Minerals & Chemical Corporation, Chicago, Ill.
 Jackle, Frank R., New York City
 Southern States Phosphate Fertilizer Co., Savannah, Ga.
 U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
 Virginia-Carolina Chemical Corp., Richmond, Va.
- SUPERPHOSPHATE—Concentrated**
 Armour Fertilizer Works, Atlanta, Ga.
 International Minerals & Chemical Corporation, Chicago, Ill.
 U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
 Virginia-Carolina Chemical Corp., Richmond, Va.
- TAGS**
 Keener Mfg. Co., Lancaster, Pa.
- TANKAGE**
 American Agricultural Chemical Co., New York City
 Armour Fertilizer Works, Atlanta, Ga.
 Ashcraft-Wilkinson Co., Atlanta, Ga.
 Baker & Bro., H. J., New York City
 Davidson Commission Co., The, Chicago, Ill.
 International Minerals & Chemical Corporation, Chicago, Ill.
 Jackle, Frank R., New York City
 McIver & Son, Alex. M., Charleston, S. C.
 Woodward & Dickerson, Inc., Philadelphia, Pa.
- VALVES**
 Atlanta Utility Works, The, East Point, Ga.
 Monarch Mfg. Works, Inc., Philadelphia, Pa.

Alphabetical List of Advertisers

- American Agricultural Chemical Co., New York City..... 4
 American Potash and Chemical Corp., New York City..... 5
 Arkansas Rice Growers Coop. Assn., Stuttgart, Ark. —
 Armour Fertilizer Works, Atlanta, Ga..... 25
 Ashcraft-Wilkinson Co., Atlanta, Ga..... 21
 Atlanta Utility Works, The, East Point, Ga..... —
 Baker & Bro., H. J., New York City..... Front Cover
 Baughman Mfg. Co., Jerseyville, Ill..... 17
 Bemis Bro. Bag Co., St. Louis, Mo..... 3
 Bradley Pulverizer Co., Allentown, Pa..... 24
 Chase Bag Co., Chicago, Ill..... 23
 Chemical Construction Corp., New York City..... 27
 Commercial Solvents Corp., Agricultural Div., New York City..... 2nd Cover
 Davidson Commission Co., The, Chicago Ill..... 20
 Davison Chemical Corp., The, Baltimore, Md..... —
 Fulton Bag & Cotton Mills, Atlanta, Ga..... 27
 Gascoyne & Co., Inc., Baltimore, Md..... 34
 Hammond Bag & Paper Co., Wellsburg, W. Va..... —
 Hayward Company, The, New York City..... 34
 Hough Co., The Frank G., Libertyville, Ill..... —
 Huber Co., L. W., New York City..... —
 International Minerals & Chemical Corporation, Chicago, Ill..... 19
 International Paper Co., Bagpak Div., New York City..... —
 Jaite Company, The Jaite, Ohio..... —
 Jackle, Frank R., New York City..... 14
 Keener Mfg. Co., Lancaster, Pa..... 34
 Keim, Samuel D., Philadelphia, Pa..... 33
 Kent Mill Co., Brooklyn, N. Y..... 27
 Kramarsky Corp., Felix, New York City..... 22
 Lion Oil Company, El Dorado, Ark..... 6
 McIver & Son, Alex. M., Charleston, S. C..... 21
 Monarch Mfg. Works, Inc., Philadelphia, Pa..... 34
 Monsanto Chemical Co., St. Louis, Mo..... —
 Potash Co. of America, New York City..... 3rd Cover
 Quaker Oats Company, Chicago, Ill..... 25
 Raymond Bag Co., Middletown, Ohio..... —
 Sackett & Sons Co., The A. J., Baltimore, Md..... —
 Schmutz Mfg. Co., Louisville, Ky..... —
 Shuey & Company, Inc., Savannah, Ga..... 34
 Southern Lead Burning Co. Atlanta, Ga..... 26
 Southern States Phosphate & Fertilizer Co., Savannah, Ga..... —
 Spencer Chemical Co., Kansas City, Mo..... —
 Stedman's Foundry and Machine Works, Aurora, Ind..... 18
 St. Regis Paper Co., New York City..... —
 Sturtevant Mill Co., Boston, Mass..... —
 Tennessee Corporation, Atlanta, Ga..... —
 Texas Gulf Sulphur Co., New York City..... —
 Titlestad Corporation, Nicolay, New York City..... 28
 U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla..... 25
 United States Potash Co., New York City..... Back Cover
 Virginia-Carolina Chemical Corp., Richmond, Va..... 27
 Wiley & Company, Inc., Baltimore, Md..... 34
 Woodward & Dickerson Inc., Philadelphia, Pa..... 16

FEEDING AND FERTILIZER MATERIALS

(SINCE 1898)

SAMUEL D. KEIM
 1343 ARCH STREET
 PHILADELPHIA 7, PA.

MONARCH SPRAYS

This is our Fig. 645 Nozzle. Used for Scrubbing Acid Phosphate Gases. Made for "full" or "hollow" cone in Brass and "Everdur." We also make "Non-Clog" Nozzles in Brass and Steel, and Stoneware Chamber Sprays now used by nearly all chamber spray sulphuric acid plants.

CATALOG 6-C

MONARCH MFG. WORKS, INC.
2501 East Ontario St., Philadelphia. Pa.

SHUEY & COMPANY, Inc.

Specialty: Analysis of Fertilizer Materials and Phosphate Rock. Official Chemists for Florida Hard Rock Phosphate Export Association. Official Weigher and Sampler for the National Cottonseed Products Association at Savannah; also Official Chemists for National Cottonseed Products Association
115 E. BAYSTREET. SAVANNAH. GA.

HAYWARD BUCKETS

Use this Hayward Class "K" Clam Shell for severe superphosphate digging and handling.

THE HAYWARD CO., 202 Fulton St., New York

**GASCOYNE & CO., INC.**

Established 1887

Chemists and Assayers

Public Weighers and Samplers

27 South Gay Street - BALTIMORE, MD.



KEENER MFG. CO., TAG MAKERS

438 Lancaster Ave., LANCASTER, PA.

WILEY & COMPANY, Inc.
Analytical and Consulting Chemists
BALTIMORE 2, MD.

Dictionary of Fertilizer Materials and Terms

A new revised edition containing complete descriptions and analyses, together with A. O. A. C. official definitions, of all plant foods and materials used in the manufacture of chemical fertilizers.

The new edition is enlarged in content and size—6 x 9 inches. As a reference booklet for all who are interested in the manufacture or use of chemical fertilizers, the dictionary will prove invaluable. For the agricultural chemist as well as the fertilizer salesman, it will serve as an authoritative source of information that will give quick and accurate answers to questions that arise daily.

PRICE **\$1.00** *postpaid*

WARE BROS. COMPANY

1900 CHESTNUT STREET
PHILADELPHIA 3, PA.





Quality and Service

You are assured on two important points — even in today's abnormal market — when you deal with P. C. A.

1. Quality . . . our Red Indian products are of unquestioned excellence.
2. Service . . . we make every effort to give you the service you want and deserve.

When better service is possible be assured P. C. A. will give it. Meanwhile your confidence, and your patience are greatly appreciated.

POTASH COMPANY OF AMERICA

CARLSBAD, NEW MEXICO

GENERAL SALES OFFICE . . 50 Broadway, New York, N. Y. • MIDWESTERN SALES OFFICE . . First National Bank Bldg., Peoria, Ill.
SOUTHERN SALES OFFICE . . Candler Building, Atlanta, Ga.

FEBRUARY THAW

Melting of icicles in these first warm days, reminds us of the fact that before many more weeks another season's crops will begin calling upon this country's soil for nutriment.

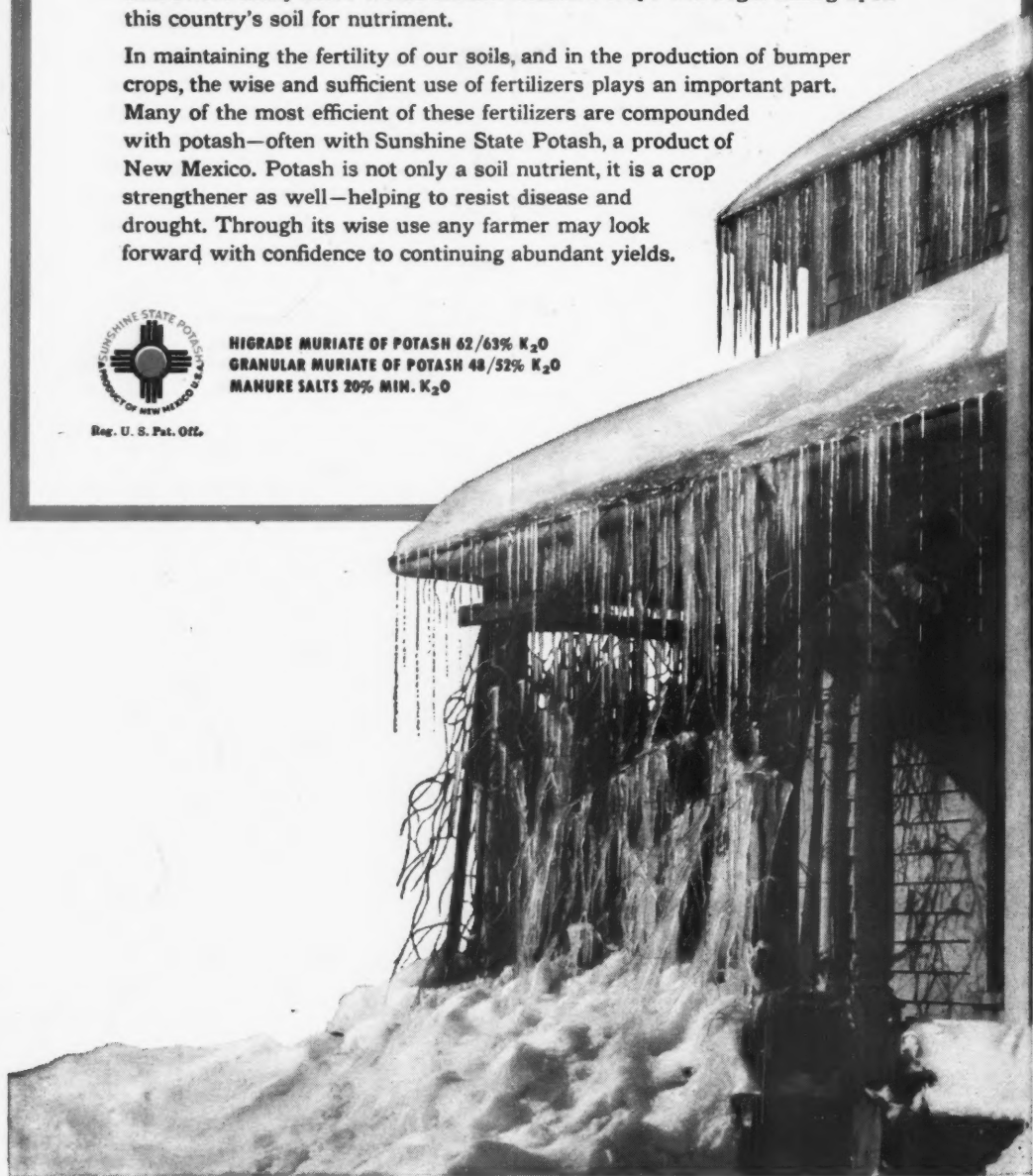
In maintaining the fertility of our soils, and in the production of bumper crops, the wise and sufficient use of fertilizers plays an important part.

Many of the most efficient of these fertilizers are compounded with potash—often with Sunshine State Potash, a product of New Mexico. Potash is not only a soil nutrient, it is a crop strengthener as well—helping to resist disease and drought. Through its wise use any farmer may look forward with confidence to continuing abundant yields.



Reg. U. S. Pat. Off.

HIGRADE MURIATE OF POTASH 62/63% K_2O
GRANULAR MURIATE OF POTASH 48/52% K_2O
MANURE SALTS 20% MIN. K_2O



UNITED STATES POTASH COMPANY, Incorporated, 30 Rockefeller Plaza, New York 20, N. Y.

